

# PHYSICS (PHS)

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## PHS 201 College Physics I (3)

Prerequisite(s): MS 113 or 117.

Concurrent enrollment in PHS 203 is required. This course is the first half of a two-semester sequence that introduces basic concepts in physics. Beginning with mechanics and motion, we develop methods for mathematically describing the way objects move and predicting their future movement. The course proceeds to study wave motion with springs, strings, water, sound, and light. Does not count toward the Physics minor. Credit will not be granted for both 201 and 211.

## PHS 202 College Physics II (3)

Prerequisite(s): PHS 201 and either MS 113 or MS 119.

Concurrent enrollment in PHS 204 is required. The second half of this sequence of courses begins by studying electricity and basic circuits, followed by magnetism. A section on light, including lenses and mirrors, follows. The behavior of light waves such as rainbows and soap bubbles will also be explored. Finally, topics from quantum mechanics and special relativity are introduced to give students a flavor of the revolutionary nature of these topics in their original scientific setting. Does not count toward the Physics minor. Credit will not be given for both PHS 202 and PHS 212.

## PHS 203 College Physics Laboratory Techniques I (1)

Concurrent enrollment in PHS 201 is required. Two laboratory hours each week. Concepts of physics developed in the associated courses will be studied through the use of hands-on activities. Students will work in groups to explore topics in motion, mechanics, waves, and sound. Does not count toward the physics minor. PHS 203 is cross-listed with PHS 213, and only one may be taken for credit.

## PHS 204 College Physics Laboratory Techniques II (1)

Concurrent enrollment in PHS 202 is required. Two laboratory hours each week. Concepts of physics developed in the associated courses will be studied through the use of hands-on activities. Students will work in groups to explore topics in electricity, magnetism, optics, and modern physics. Does not count toward the physics minor. PHS 204 is cross-listed with PHS 214, and only one may be taken for credit.

## PHS 221 Physics for Scientists and Engineers I w/Lab (4)

Corequisite(s): MS 125.

Prerequisite or First in a two-semester introductory sequence introducing major ideas from classical physics. Topics include Newtonian mechanics, conservation laws, and waves. Course meetings include lab activities, group discussions, and lectures. The lab component is incorporated into the class time. Calculus is integrated into the mathematical language of the course. Credit will not be granted for both PHS 201 and 221.

## PHS 222 Physics for Scientists and Engineers II w/Lab (4)

Prerequisite(s): PHS 221.

Corequisite(s): MS 126.

Prerequisite or Second in a two-semester sequence introducing major ideas of physics. Topics include electricity, magnetism, optics, and thermal physics. Course meetings include lab activities, group discussions, and lectures. The lab component is incorporated into the class time. Calculus is integrated into the mathematical language of the course. Credit will not be granted for both PHS 202 and 222.

## PHS 301 Modern Physics (3)

Prerequisite(s): PHS 221 and PHS 222.

Explore the two 20th century revolutions in physics: quantum mechanics and special relativity. We will study the evidence that led to the acceptance of each of these theories and some of the implications of these theories. Both quantum mechanics and relativity have become part of popular culture. This course offers the opportunity to understand their ideas in their original context and see how popular culture's usage differs from scientific usage.

## PHS 303 Classical Mechanics (3)

Prerequisite(s): PHS 221 and PHS 222.

This course investigates various aspects of classical mechanics including: kinematics and dynamics of motion, rigid bodies, oscillatory motion, central forces and gravitation, and Lagrangian and Hamiltonian formulations of classical mechanics.

## PHS 327 Elementary Radiation Physics (3)

This course is intended for any student interested in radiation safety and specifically for students in Physics, Chemistry, Pre-medicine, Pre-dentistry, Nursing, Biology, and Archaeology. The course objective is to provide individuals with the knowledge and procedures necessary to minimize exposures to ionizing and non-ionizing radiation and to understand the physiological and environmental effects of radiation. Instruction will include lectures, discussions, demonstration, and laboratory exercises.

## PHS 343 Electromagnetic Fields (3)

Prerequisite(s): MS 227, PHS 221, and PHS 222.

Electric and magnetic fields will be studied. What are their origins? What features of nature affect the nature and strength of the fields? What are some of their effects? Maxwell's equations uniting all of electricity and magnetism will be seen in their full glory.

## PHS 350 Physics in Music (3)

This course will explore the physics involved in music. A variety of questions with sound and music will be explored. What physical properties can be used to describe sound? How do musical instruments produce sound? What are the physical reasons that instruments playing the same note sound different? How does sound travel through space? Why does your voice sound so different on a recording? Students will be encouraged to generate and explore their own questions. Some of the class periods will be devoted to a hands-on look at ideas. This course is designed to be descriptive in nature rather than highly mathematical. No math or physics prerequisites.

## PHS 371 Astronomy (4)

3 hours lecture/2 hours lab per week. A survey of the structure and evolution of the universe, from planets to stars and galaxies. Questions about the nature of science, limits to current knowledge, and the influence of space science will be addressed. The course culminates in individual in-dept explorations of particular aspects of astronomy.

## PHS 383 Special Topics (3)

Prerequisite(s): PHS 202 or PHS 222.

This course will explore a topic of current interest in the field of physics. May be taken twice for a total of 6 semester hours.

## PHS 491 Quantum Mechanics (3)

Prerequisite(s): PHS 221, PHS 222, PHS 301, PHS 343, and MS 344.

An extension of the investigation of quantum mechanics begun in PHS 301 to include the full mathematical development of the theory. Basic tools including linear operators and matrices will be used to explore physical systems.